CLAIMS:

We Claim:

1. In a method for computing and regulating the distribution of linear load in a multi-nip calender in which a material web is passed through the nips, the nips being defined by a set of rolls arranged in a substantially vertical position and including a variable-crown upper roll, a variable-crown lower roll and at least two intermediate rolls arranged between the upper roll and the lower roll, said at least two intermediate rolls being provided with support cylinders, all of the rolls in the set of rolls being supported such that, when in nip-defining relationship, the rolls have bending lines which are curved downward, the improvement comprising the steps of:

determining at least one physical property affecting the bending of each of said at least two intermediate rolls, and

regulating at least one of a ratio of the linear loads applied to said at least two intermediate rolls, the weight of said at least two intermediate rolls, and support forces applied to said at least two intermediate rolls such that the set of rolls is in a state of equilibrium and a predetermined state of deflection.

2. The method of claim 1, wherein step of determining the at least one physical property affecting the bending of each of said at least two intermediate rolls comprises the step of determining the bending rigidity, mass, shape, and material of each of said at least two intermediate rolls.

3. The method of claim 1, wherein the ratio of the linear loads applied to said at least two intermediate rolls, the weight of said at least two intermediate rolls, and the support forces applied to said at least two intermediate rolls are all regulated such that the set of rolls is in the state of equilibrium and the predetermined state of deflection.

4. The method of claim 1, wherein said at least one physical property is selected from a group consisting of bending rigidity, mass, shape, and material.

5. The method of claim 1, further comprising the step of:

providing each of said at least two intermediate rolls with deflection properties different than other of said at least two intermediate rolls.

6. The method of claim 1, further comprising the step of:

treating the set of rolls as a single unit when regulating the at least one of the ratio of linear loads, the weight of said at least two intermediate rolls and the support forces applied to said at least two intermediate rolls.

~~7. The method of claim 1, wherein the computing is carried out by the pair of rolls.~~

8. The method of claim 1, further comprising the step of:

supporting said at least two intermediate rolls on a frame of the calender such that said at least two intermediate rolls are freely movable.

9. The method of claim 1, wherein the at least one of a ratio of the linear loads applied to said at least two intermediate rolls, the weight of said at least two intermediate rolls, and support forces applied to said at least two intermediate rolls is regulated such that a loading angle is about 90°, the loading angle being defined as the distribution of linear load in the set of rolls from nip to nip.

10. The method of claim 1, wherein the at least one of a ratio of the linear loads applied to said at least two intermediate rolls, the weight of said at least two intermediate rolls, and support forces applied to said at least two intermediate rolls is regulated such that a loading angle is adjustable in a range from about 75° to about 80°, the loading angle being defined as the distribution of linear load in the set of rolls from nip to nip.

11. In an arrangement for computing and regulating the distribution of linear load in a multi-nip calender in which a material web is passed through the nips, the nips being defined by a set of rolls arranged in a substantially vertical position and including a variable-crown upper roll, a variable-crown lower roll and at least two intermediate rolls arranged between the upper roll and the lower roll, said at least two intermediate rolls being provided with support cylinders, all of the rolls in the set of rolls being supported such that, when in nip-defining relationship, the rolls have bending lines which are curved downward, the improvement comprising:

an automation system and a computing unit for determining at least one physical property affecting the bending of each of said at least two intermediate rolls and for regulating at least one of a ratio of the linear loads applied to said at least two intermediate rolls, the weight of said at

least two intermediate rolls, and support forces applied to said at least two intermediate rolls such that the set of rolls is in a state of equilibrium and a predetermined state of deflection.

12. The arrangement of claim 11, wherein each of said at least two intermediate rolls has deflection properties different from other of said at least two intermediate rolls.

13. The arrangement of claim 11, wherein the set of rolls is treated as a single unit.

~~14. The arrangement of claim 11, wherein the computing is carried out by the pair of rolls.~~

15. The arrangement of claim 11, wherein the at least one physical property affecting the bending of each of said at least two intermediate rolls is the bending rigidity, mass, shape, and material of each of said at least two intermediate rolls.

16. The arrangement of claim 11, wherein the ratio of the linear loads applied to said at least two intermediate rolls, the weight of said at least two intermediate rolls, and the support forces applied to said at least two intermediate rolls are all regulated such that the set of rolls is in the state of equilibrium and the predetermined state of deflection.

~~17. A multi-nip calender for carrying out the method of claim 1.~~